

REMARKS

In section 3 of the Office Action, the Examiner rejected claims 1-6, 11, 12, and 31-33 under 35 U.S.C §102(b) as being anticipated by the Torok patent.

The Torok patent discloses in Figure 3a a transpinnor 300 in which four giant magnetoresistive (GMR) films 302 are arranged in a bridge with a conductor 304 wound through the GMR films 302. The input of the transpinnor 300 is provided to terminals 306 and 308 and is completely isolated resistively from the output between nodes 310 and 312.

The Torok patent discloses in Figure 5 a transpinnor 500 having an open-flux configuration. The transpinnor 500 is substantially the same schematically as the transpinnor 300. Thus, giant magnetoresistive film elements 502, 504, 506 and 508 form a Wheatstone bridge. An input conductor 510 is wound as a single layer of magnet wire.

Independent claim 1 is directed to an integrated signal isolator having first and second ends and comprising first and second isolator input terminals to receive a signal to be isolated, first and second isolator output terminals to provide an isolated output signal, first and second power supply terminals, first,

second, third, and fourth magnetoresistors, and an input strap. The first and second magnetoresistors are coupled to the first isolator output terminal, the second and third magnetoresistors are coupled to the first supply terminal, the third and fourth magnetoresistors are coupled to the second isolator output terminal, and the first and fourth magnetoresistors are coupled to the second supply terminal. The input strap has at least one turn coupled between the first and second isolator input terminals, and the input strap is disposed with respect to the first, second, third, and fourth magnetoresistors so that a magnetic field is generated over the first and second magnetoresistors in one direction, and so that a magnetic field is generated over the third and fourth magnetoresistors in an opposite direction.

The Torok patent does not show an input strap that is disposed with respect to first, second, third, and fourth magnetoresistors so that a magnetic field is generated over the first and second magnetoresistors in one direction, and so that a magnetic field is generated over the third and fourth magnetoresistors in an opposite direction.

More particularly, the Examiner first states that independent claim 1 reads on Figure 3a of the Torok

patent. However, it does not. Independent claim 1 requires a particular relationship between the GMR films 302 shown in Figure 3a of the Torok patent. Thus, based on this relationship, the GMR film 302 that is coupled between line 310 and B- is the second magnetoresistor of independent claim 1, the GMR film 302 that is coupled between line 310 and B+ is the first magnetoresistor of independent claim 1, the GMR film 302 that is coupled between line 312 and B+ is the fourth magnetoresistor of independent claim 1, and the GMR film 302 that is coupled between line 312 and B- is the third magnetoresistor of independent claim 1.

The input coil 304 is wound around these GMR films so that a current through the input coil 304 produces a magnetic field along the first and second GMRs in opposite directions. However, independent claim 1 requires that a current through the input strap produce a magnetic field along the first and second magnetoresistors in the same direction. Therefore, independent claim 1 cannot be read on Figure 3a of the Torok patent.

The Examiner first states that independent claim 1 reads on Figure 5 of the Torok patent. However, it does not. Independent claim 1 requires a particular

relationship between the GMR films 302 shown in Figure 5 of the Torok patent. Thus, based on this relationship, the GMR film 502 is the first magnetoresistor of independent claim 1, the GMR film 508 is the second magnetoresistor of independent claim 1, the GMR film 504 is the third magnetoresistor of independent claim 1, and the GMR film 506 is the fourth magnetoresistor of independent claim 1.

The input coil 510 is wound around these GMR films so that a current through the input coil 510 produces a magnetic field along the first and second GMRs 502 and 508 in opposite directions. However, independent claim 1 requires that a current through the input strap produce a magnetic field along the first and second magnetoresistors in the same direction. Therefore, independent claim 1 cannot be read on Figure 5 of the Torok patent.

Therefore, whether Figure 3a or Figure 5 is used, independent claim 1 is not anticipated by the Torok patent.

Independent claim 11 is directed to an integrated signal isolator having first and second ends, the integrated signal isolator comprising first, second, third, and fourth magnetoresistors, and an input strap.

The first and second magnetoresistors are coupled to a first isolator output terminal, the second and third magnetoresistors are coupled to a first supply terminal, the third and fourth magnetoresistors are coupled to a second isolator output terminal, and the first and fourth magnetoresistors are coupled to a second supply terminal. The input strap has at least one turn coupled between first and second isolator input terminals, the least one turn has a first portion running alongside only the first and second magnetoresistors and a second portion running alongside only the third and fourth magnetoresistors, the at least one turn is arranged so that current supplied to the input strap flows through the first portion in a first direction between the first and second ends and through the second portion in a second direction between the first and second ends, and the first and second directions are substantially opposite to one another.

As can be seen from Figure 3a of the Torok patent, the input coil 304 runs across all four GMR films in both directions. Thus, the input coil 304 does not run alongside any of the GMR films.

Moreover, the input coil 304 does not have a first portion that runs alongside only two of the GMR

films and a second portion that runs alongside only the other two of the GMR films.

As can be seen from Figure 5 of the Torok patent, the input coil 510 runs across all four GMR films in both directions. Thus, the input coil 510 does not run alongside any of the GMR films.

Also, the input coil 510 does not have a first portion that runs alongside only two of the GMR films and a second portion that runs alongside only the other two of the GMR films.

Therefore, whether Figure 3a or Figure 5 is used, independent claim 11 is not anticipated by the Torok patent.

New independent claim 36 is directed to a semiconductor signal isolator. The Torok patent does not disclose such a signal isolator. Therefore, independent claim 36 is not anticipated by the Torok patent.

Because independent claims 1 and 11 are not anticipated by the Torok patent, dependent claims 3-6, 12, and 31-33 are likewise not anticipated by the Torok patent.

In section 4 of the Office Action, the Examiner rejected claims 1-17 and 32-35 under 35 U.S.C. §102(b) as being anticipated by the Wan patent.

The Wan patent discloses a first magnetoresistor 24, a second magnetoresistor 26, a third magnetoresistor 30, and a fourth magnetoresistor 28 forming a Wheatstone bridge. The Wheatstone bridge is fed by a source between a pad 44 and pads 40/48, and has output pads 36 and 52. An input strap 70 produces a magnetic field over the first, second, third, and fourth magnetoresistors 24, 26, 30, and 28 in the same direction.

Independent claim 1 - Therefore, the input strap 70 is not disposed as required by independent claim 1. That is, the input strap 70 is not disposed with respect to the first, second, third, and fourth magnetoresistors 24, 26, 28, and 30 so that a magnetic field is generated over the first magnetoresistors 24 and 26 in one direction, and so that a magnetic field is generated over the third and fourth magnetoresistors 30 and 28 in an opposite direction.

Instead, current flowing through the input strap 70, depending on polarity, enters the input strap 70 at the pad 66 and exits the input strap 70 at the pad 68. Accordingly, the current flows along the first, second, third, and fourth magnetoresistors 24, 26, 30, and 28 in the same direction producing a magnetic field

over all of the first, second, third, and fourth magnetoresistors 24, 26, 30, and 28 in the same direction.

As a result, the Examiner points to the set/reset strap 54 of the Wan patent as the input strap of independent claim 1. The Wan patent refers to U.S. Pat. No. 5,247,278 in describing the set-reset function. As described in the '278 patent, a set-reset strap is used to set the direction of magnetization in magnetoresistive elements so as to eliminate any offset that might otherwise result. The duration of the current in set-reset strap is very short, less than a microsecond.

As can be seen, the Wan patent does not suggest that the set-reset strap 54 be used as an input strap coupled between first and second isolator input terminals so that circuits can be isolated from one another. Indeed, the Wan patent suggests just the opposite. Thus, those practicing in the art of magnetoresistive isolators will understand that a set-reset strap is not an input strap.

Additionally, the only time that the Wan patent uses the term "input" is in relation to the input strap

70. The Wan patent does not use the term "input" in relation to the set/reset strap 54.

Moreover, calling an elephant a lion does not make the elephant a lion. Similarly, calling the set/reset strap 54 an input strap does not make the set/reset strap 54 the input strap recited in independent claim 1.

Furthermore, the set-reset strap 54 of the Wan patent does not receive a signal to be isolated as required by independent claim 1. Therefore, the set-reset strap 54 of the Wan patent cannot be used to meet the input strap recitation of independent claim 1.

EXAMINER'S RESPONSE - The Examiner argues that the set-reset strap 54 can function as an input strap. The Examiner is not correct. The set-reset strap 54 cannot be used as the input strap of a signal isolator. The Examiner's attention is directed to the Declaration that is being submitted herewith.

The Examiner also argues that applicant admitted at page 30 of the brief that the set-reset strap 54 of the Wan patent can be used as an input strap. This argument likewise is not correct. Applicant only meant that the Examiner built an argument (albeit incorrectly) through an improper use of applicant's own disclosure.

The Examiner further argues that the set-reset strap 54 can be an input strap because any signal on the set-reset strap will produce an output from the magnetoresistors. However, this argument would not be made by one of ordinary skill in the art because one of ordinary skill in the art would not consider the input strap 70 to be a set-reset strap and the set-reset 54 to an input strap of a signal isolator.

Moreover, as discussed above, using the input strap 70 as a set-reset strap and using the set-reset 54 as an input strap would not produce a useful signal isolator, making the Examiner's interpretation of the Wan patent vis-à-vis independent claim 1 spurious.

Additionally, the Examiner refers to the Pant patent as proof that the set-reset strap 54 can be used as the input coil of a signal isolator. However, as should be clear from the discussion of the Pant patent below, the conductor 60 of the Pant patent is not equivalent to the set-reset strap 54 of the Wan patent.

Furthermore, the Examiner asserts that there is no structural difference between independent claim 1 and the Wan patent. The Examiner is incorrect. The input strap 70 as disclosed in the Wan patent does not produce

the fields as recited in independent claim 1, and the set-reset strap 54 is not an input strap.

Accordingly, because the input strap 70 disclosed in the Wan patent does not meet the limitations of independent claim 1, and because the set-reset strap 54 disclosed in the Wan patent is not an input strap that is coupled between first and second isolator input terminals of an integrated signal isolator, the Wan patent does not anticipate independent claim 1 and dependent claims 2-10 and 32-35.

Independent claim 11 - The Wan patent does not disclose the relationship between the input strap 70 and the magnetoresistors 24, 26, 28, and 30 as recited in independent claim 11. That is, the input strap 70 does not have a first portion of the input strap 70 that runs alongside the first and second magnetoresistors 24 and 26 and a second portion that runs alongside the third and fourth magnetoresistors 30 and 28

The Examiner, however, argues that the set/reset strap 54 disclosed in the Wan patent meets these limitations. However, the set-reset strap 54 does not have any portions that run alongside any of the magnetoresistors 24, 26, 28, and 30.

Moreover, as discussed above, the set-reset strap 54 does not meet the input strap limitation. That is, the Wan patent does not suggest that the set-reset strap 54 be coupled between first and second isolator input terminals of an integrated signal isolator for the purpose of isolating circuits from one another. Thus, those practicing in the art of magnetoresistive isolators will understand that a set/reset strap is not an input strap and cannot be used as an input strap.

Additionally, the only time that the Wan patent uses the term "input" is in relation to the input strap 70. The Wan patent does not use the term "input" in relation to the set/reset strap 54.

Moreover, calling a set-reset strap an input strap does not make the set-reset strap an input strap.

EXAMINER'S RESPONSE - The Examiner's argument is discussed above.

Accordingly, for all of the reasons given above, the Wan patent does not anticipate independent claim 11 and dependent claims 12-17.

Independent claim 36 is patentable over the Wan patent for reasons similar to those give above with respect to independent claim 1.

In section 5 of the Office Action, the Examiner rejected claims 1-5, 11-15, and 31-33 under 35 U.S.C. §102(b) as being anticipated by the Pant patent.

The Pant patent discloses a magnetic field sensor 10 in an integrated circuit layout. The magnetic field sensor 10 includes magnetoresistors 14, 16, 18, and 20 arranged in a Wheatstone bridge configuration. Each of the magnetoresistors 14, 16, 18, and 20 is an array of six parallel positioned magnetoresistive strips 22 electrically connected in series with one another. The magnetoresistors 14, 16, 18, and 20 are interconnected and are connected to pads 26, 28, 30, 32, and 34. The pads 28 and 30 are coupled across a bridge voltage supply. The pad 26 is connected to the pad 34, and the output of bridge is provided by the pads 26 and 30.

A conductor 60 is a current strap extending between a pad 64 and a pad 66. The conductor 60 extends in a clockwise direction from the pad 64 to the pad 66.

In applying the Pant patent to independent claim 1, the first and second magnetoresistors of independent claim 1 are the magnetoresistors 14 and 18 of the Pant patent because they are connected to the first isolator output terminal 26/34, the second and third magnetoresistors are the magnetoresistors 18 and 20

because they are coupled to the first supply terminal 32, the third and fourth magnetoresistors are the magnetoresistors 20 and 16 because they are coupled to the second isolator output terminal 30, and the first and fourth magnetoresistors are the magnetoresistors 14 and 16 because they coupled to the second supply terminal 16.

Accordingly, the conductor 60 does not meet the input strap limitation of independent claim 1 because the conductor 60 is not disposed with respect to the first, second, third, and fourth magnetoresistors 14, 18, 20, and 16 so that a magnetic field is generated over the first and second magnetoresistors 14 and 18 in one direction and so that a magnetic field is generated over the third and fourth magnetoresistors 20 and 16 in an opposite direction.

Therefore, independent claim 1 is not anticipated by the Pant patent.

With respect to independent claim 11, the conductor 60 of the Pant patent does not run alongside any of the magnetoresistors 14, 16, 18, and 20. Instead, the conductor 60 of the Pant patent runs across the magnetoresistors 14, 16, 18, and 20.

Also, the conductor 60 does not have a first portion that runs alongside only the first and second

magnetoresistors 14 and 18 and a second that runs alongside only the third and fourth magnetoresistors 20 and 16.

Therefore, independent claim 11 is not anticipated by the Pant patent.

Independent claim 36 is not anticipated by the Pant patent because the conductor 60 is not disposed with respect to the first, second, third, and fourth magnetoresistors 14, 18, 20, and 16 so that a magnetic field is generated over the first and second magnetoresistors 14 and 18 in one direction and so that a magnetic field is generated over the third and fourth magnetoresistors 20 and 16 in an opposite direction.

CONCLUSION

In view of the above, it is clear that the claims of the present application patentably distinguish over the art applied by the Examiner. Accordingly, allowance of these claims and issuance of the above captioned patent application are respectfully requested.

Respectfully submitted,

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